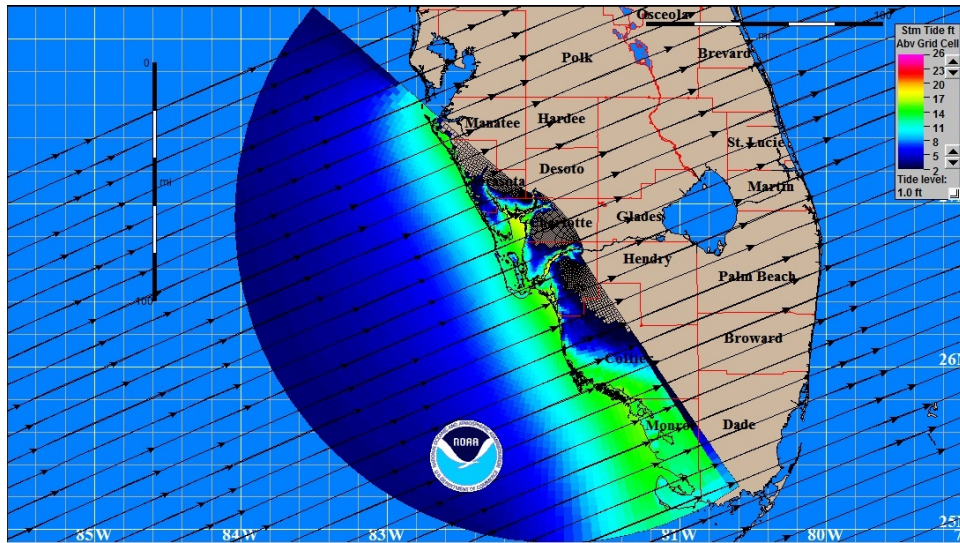


Florida Evacuation Planning Discussion

Andrew Sussman
Special Projects/Hurricane Program Manager
November 15, 2017



Sea & Lake Overland Surges from Hurricanes

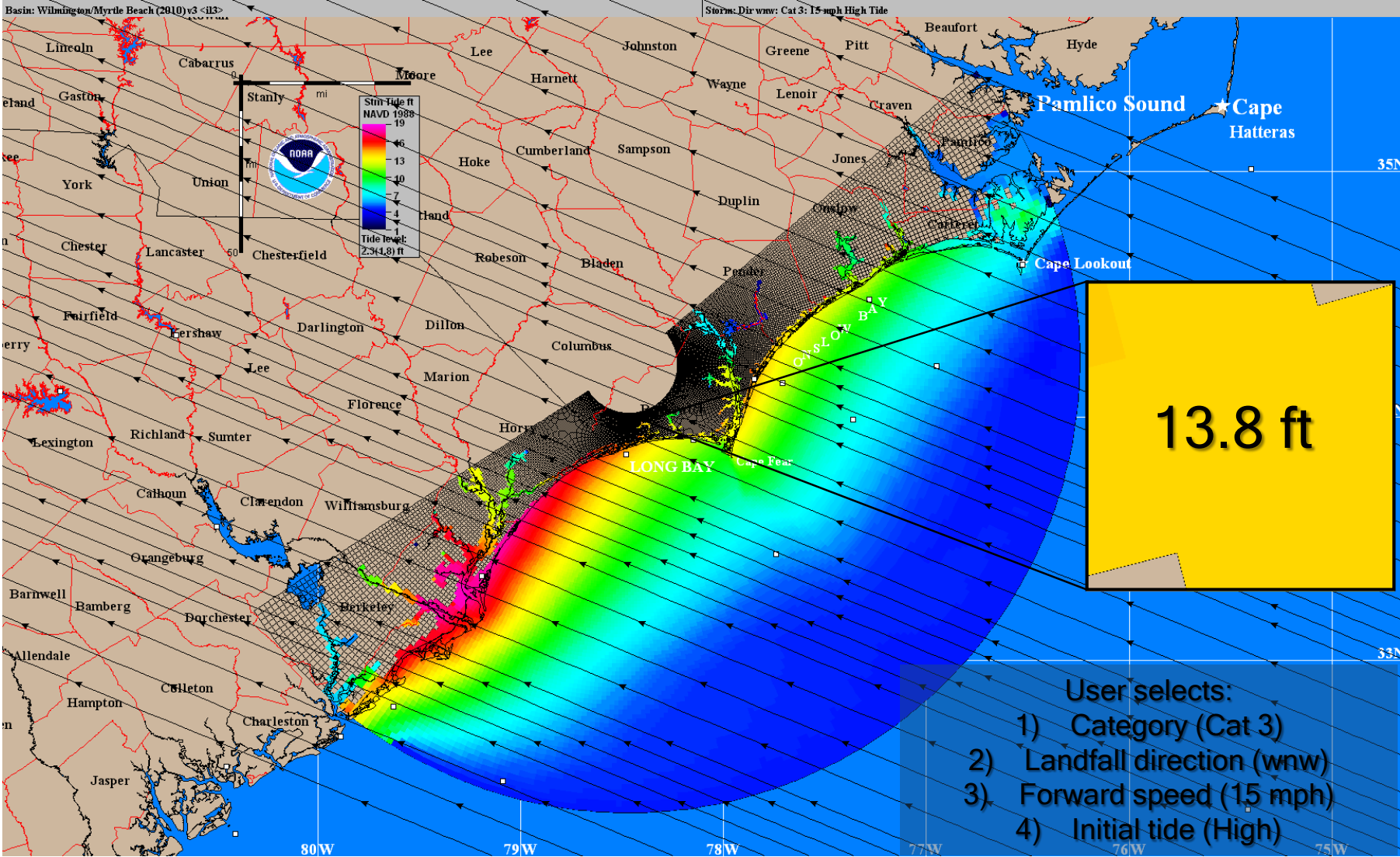


MEOW: Maximum Envelope of Overland Water

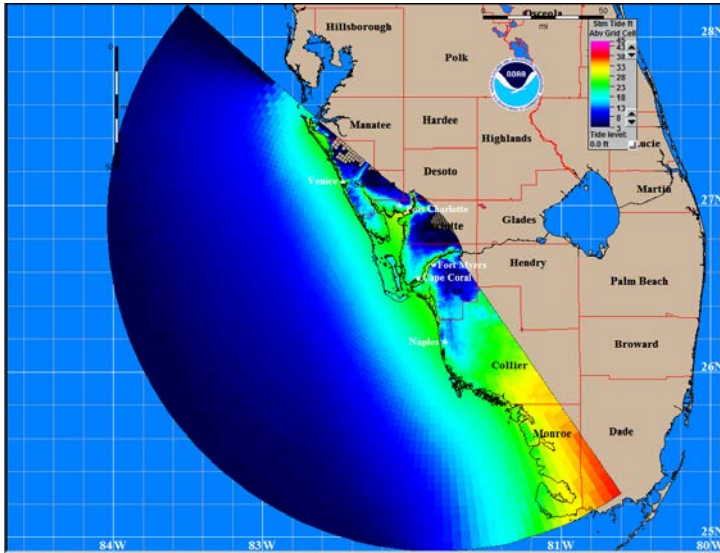
- Worst case basin snapshot for a particular storm category, forward speed, trajectory, and initial tide level, incorporating uncertainty in forecast landfall location.
- MEOWs are not storm specific.
- **No single hurricane will produce the regional flooding depicted in the MEOWs.**
<http://www.nhc.noaa.gov/surge/meowOverview.php>.



How a MEOW is created.



Sea & Lake Overland Surge from Hurricanes



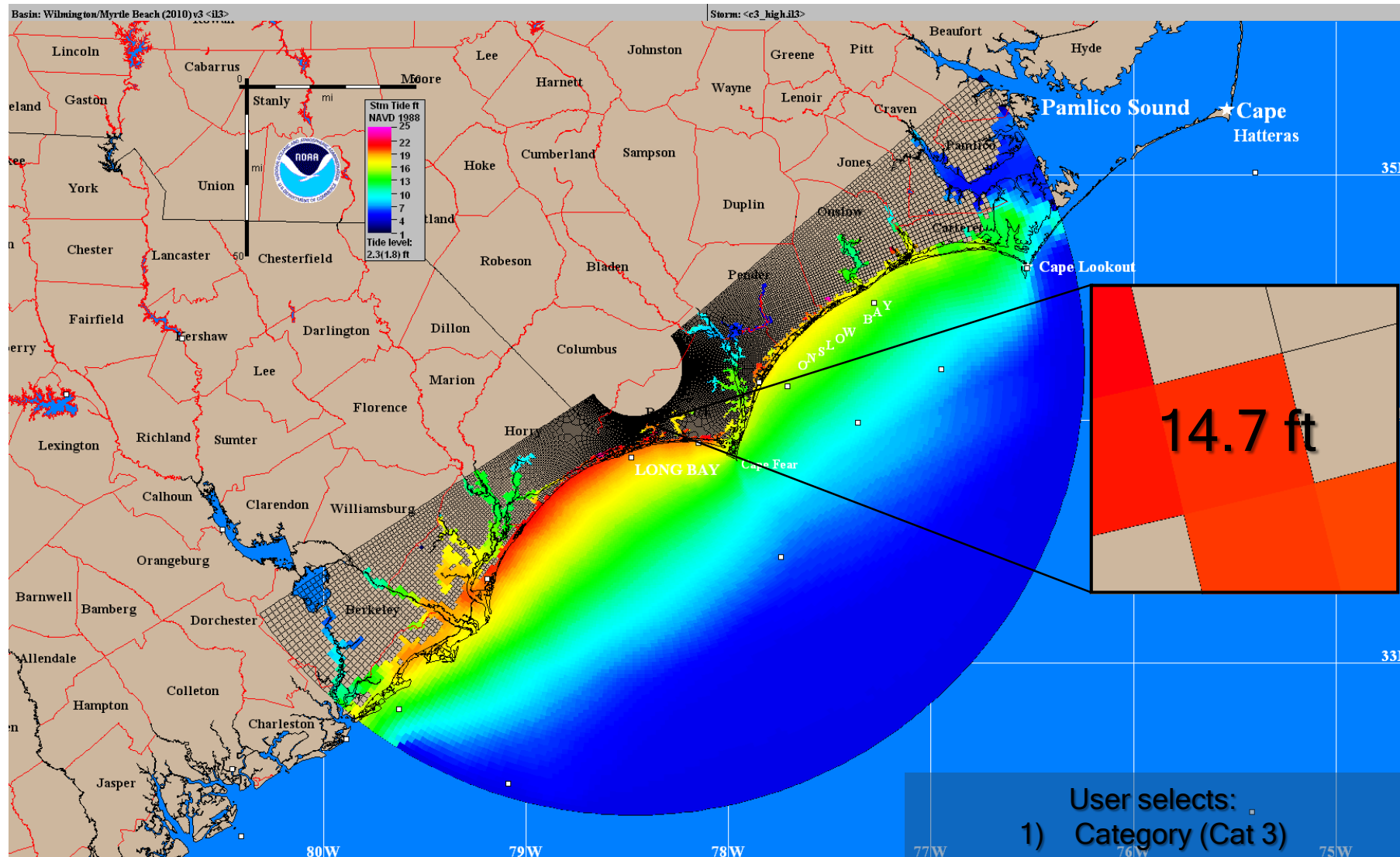
MOM: Maximum of the MEOWS

- Worst cast snapshot for a particular storm category under "perfect" storm conditions. Each MOM considers combinations of forward speed, trajectory, and initial tide level.
- As with [MEOWs](#), MOMs are not storm specific.
- No single hurricane will produce the regional flooding depicted in the MOMs.

<http://www.nhc.noaa.gov/surge/momOverview.php>.



Maximum of the MEOWs (MOMs)

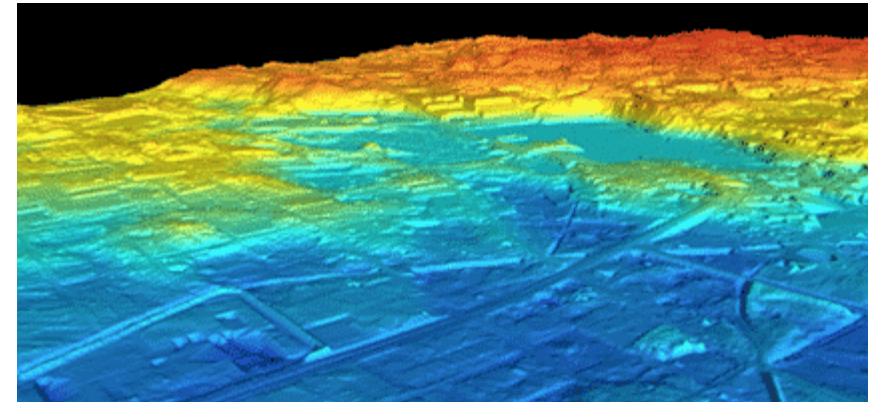


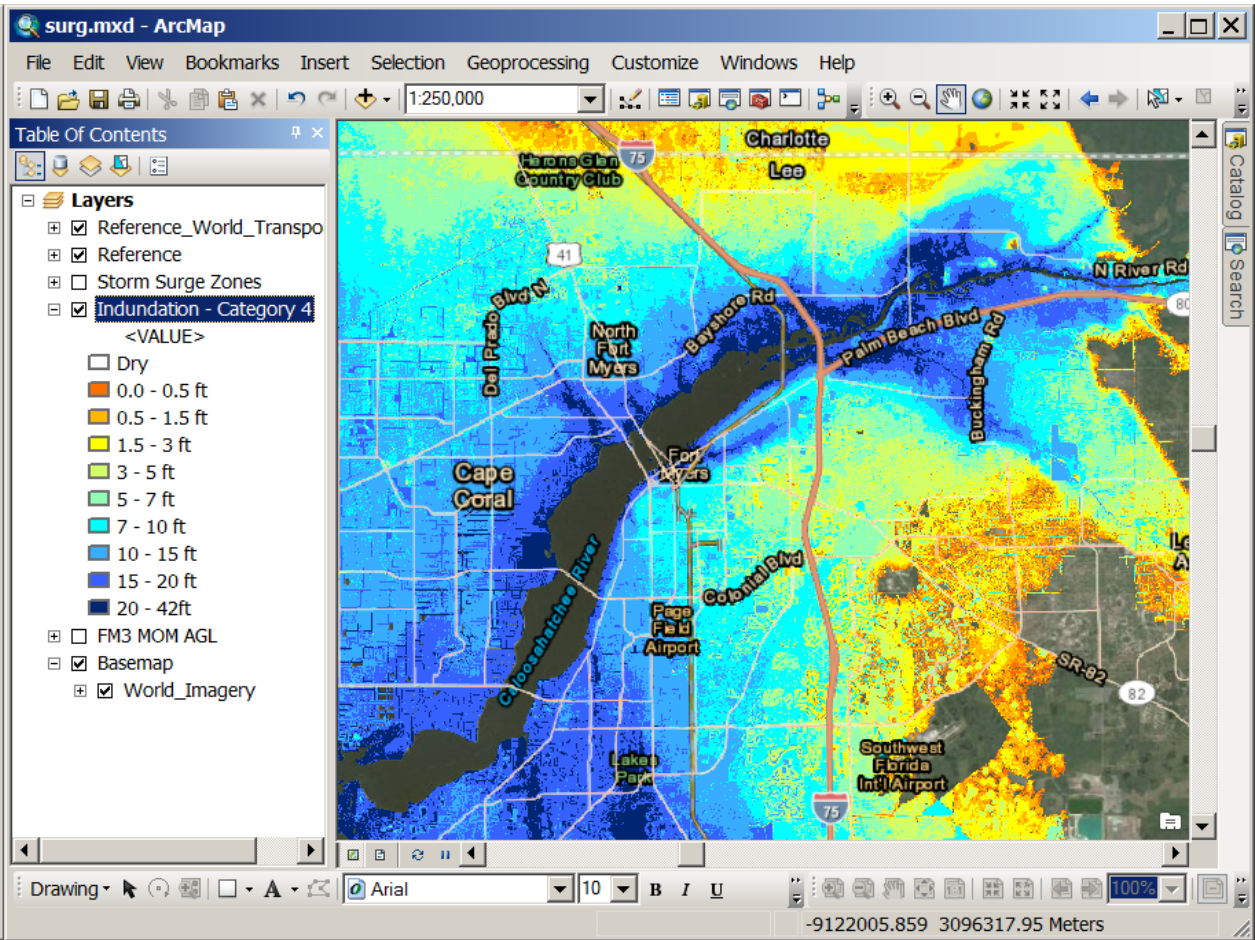
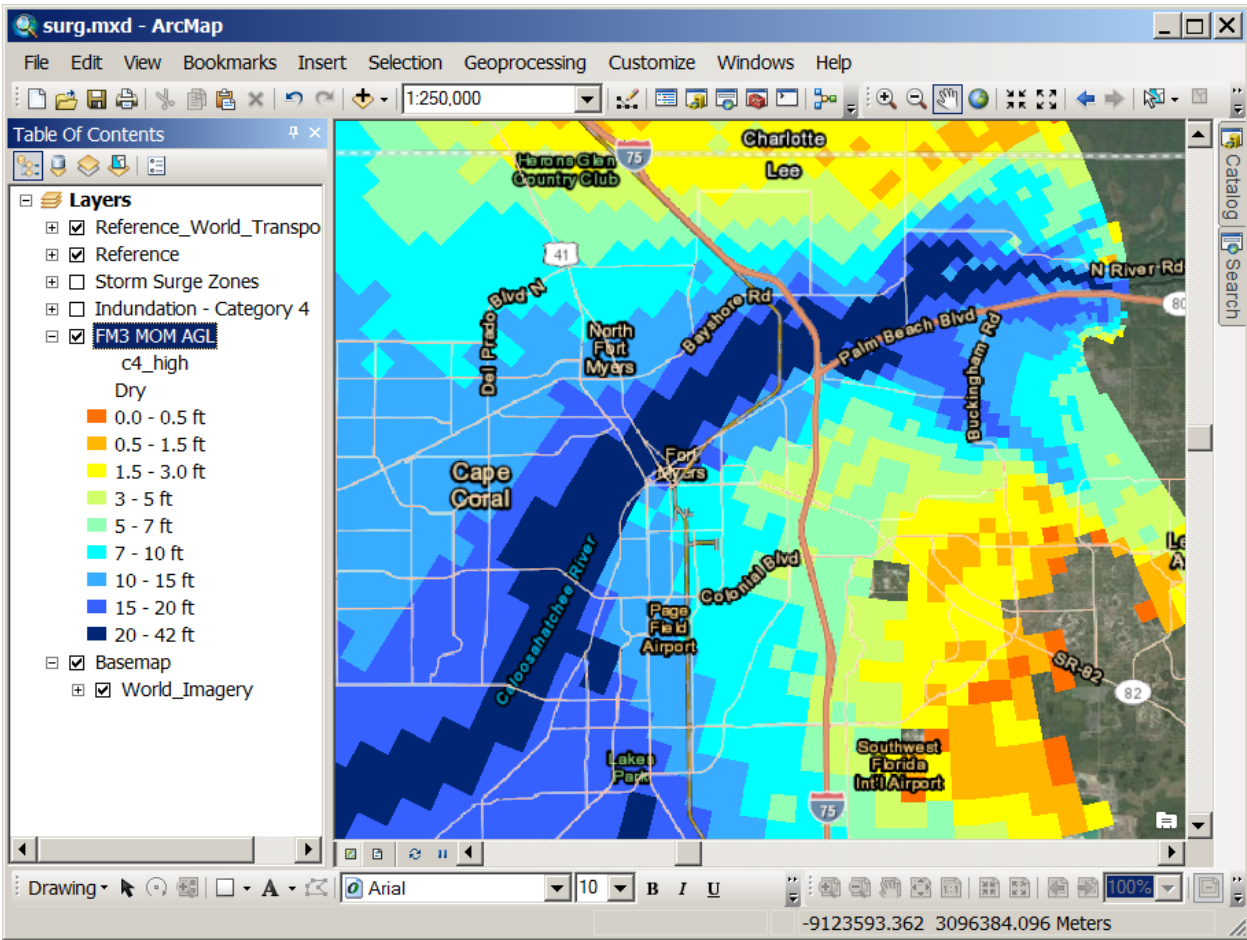
What Florida Does with SLOSH?

- We increase the resolution with Digital Elevation Modeling

Florida Statute 163.3178(2)(d)-The Division of Emergency Management shall:

- manage the update of the regional hurricane evacuation studies,
- ensure such studies are done in a consistent manner,
- **and ensure that the methodology used for modeling storm surge is that used by the National Hurricane Center.**





Volume 7 Storm Tide Atlas

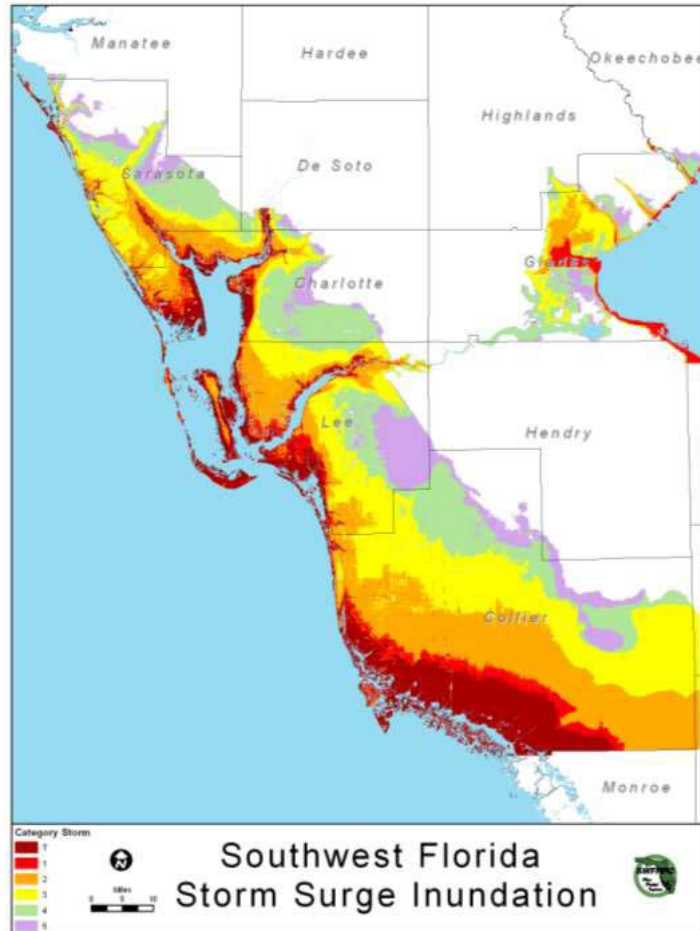


Table 2 Southwest Florida Basin Hypothetical Storm Parameters

Directions, speeds, (Saffir/Simpson) intensities, number of tracks and the number of runs.

Direction	Speeds (mph)	Size (Radius of Maximum winds)	Intensity	Tides	Tracks	Runs
WSW	5,10,15, 25 mph	20 statute miles; 35 statute miles	1 through 5	Mean/High	18	1440
W	5,10,15, 25 mph	20 statute miles; 35 statute miles	1 through 5	Mean/High	14	1120
WNW	5,10,15, 25 mph	20 statute miles; 35 statute miles	1 through 5	Mean/High	16	1280
NW	5,10,15, 25 mph	20 statute miles; 35 statute miles	1 through 5	Mean/High	14	1120
NNW	5,10,15, 25 mph	20 statute miles; 35 statute miles	1 through 5	Mean/High	14	1120
N	5,10,15, 25 mph	20 statute miles; 35 statute miles	1 through 5	Mean/High	10	800
NNE	5,10,15, 25 mph	20 statute miles; 35 statute miles	1 through 5	Mean/High	13	1040
NE	5,10,15, 25 mph	20 statute miles; 35 statute miles	1 through 5	Mean/High	17	1360
ENE	5,10,15, 25 mph	20 statute miles; 35 statute miles	1 through 5	Mean/High	17	1360
E	5,10,15, 25 mph	20 statute miles; 35 statute miles	1 through 5	Mean/High	17	1360
TOTAL						12,000

From Surge to Evacuation Planning Information

- County emergency management creates evacuation zones based on this information.
- This information is modeled in the Transportation Interface for Modeling Evacuations (TIME).
 - Demographic, Roadway Network, University Populations, Tourist Rates, Shelters, Response Curves, Behavioral Response, # of counties.
- Results:
 - Evacuation Clearance Times.
 - Potential Size of the Evacuating Population.
 - Shelter Demand.
 - Potential congestion areas on highways.



A-E does not mean Category 1-5

Table ES-11: 2010 Clearance Times for Base Scenario

	Evacuation Level A Base Scenario	Evacuation Level B Base Scenario	Evacuation Level C Base Scenario	Evacuation Level D Base Scenario	Evacuation Level E Base Scenario
Clearance Time to Shelter					
County	13.5	18.5	25.5	50.0	62.0
County	13.0	19.0	38.5	45.5	66.5
County	11.5	11.5	11.5	11.5	12.0
County	13.5	16.0	31.5	39.5	55.5
County	13.0	19.0	42.0	48.0	63.0
County	13.0	19.5	30.5	40.5	65.5
In-County Clearance Time					
County	15.0	26.5	45.0	52.0	70.5
County	14.0	19.0	39.0	46.0	68.5
County	13.0	13.0	13.0	13.0	13.5
County	14.0	16.5	43.5	52.0	66.0
County	13.5	23.0	43.5	52.5	66.0
County	15.5	27.0	45.0	52.5	69.5
Out of County Clearance Time					
County	15.0	26.5	45.0	52.0	70.5
County	14.5	19.5	44.5	46.0	69.0
County	15.5	24.0	45.0	62.5	89.5
County	14.5	24.0	44.5	53.5	71.0
County	14.0	23.0	43.5	52.5	66.0
County	15.5	27.0	45.0	52.5	69.5
Regional Clearance Time					
	15.5	27.0	45.0	62.5	89.5

Andrew Cat 5

Charley Cat 4

Ike Cat 2

Katrina Cat 3

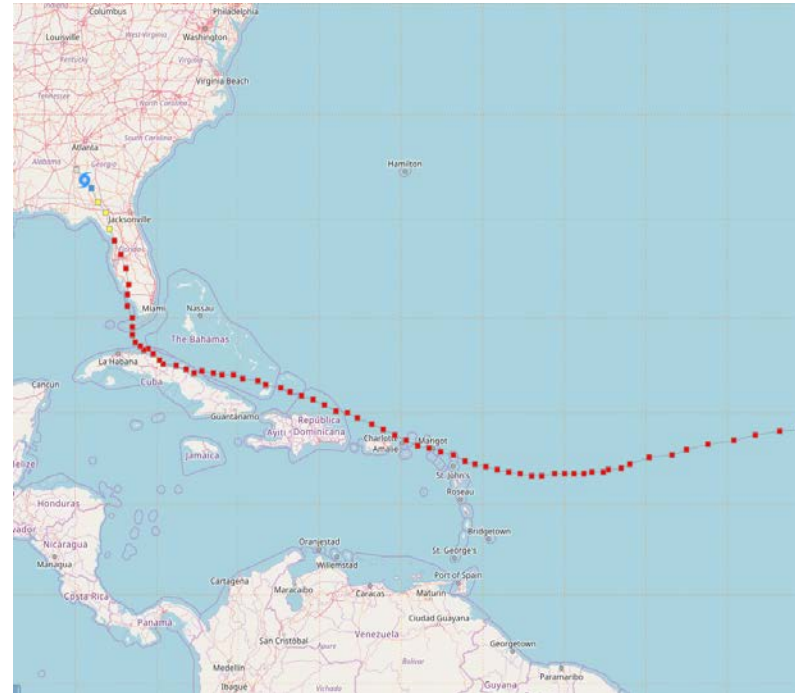
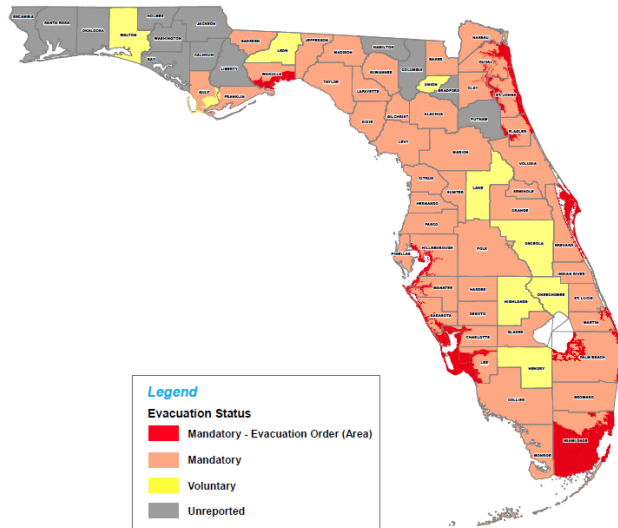


Irma Versus Donna

Hurricane **Irma** September 10-11, 2017

Hurricane **Donna** September 10-11, 1960

Hurricane **Irma** Evacuation orders

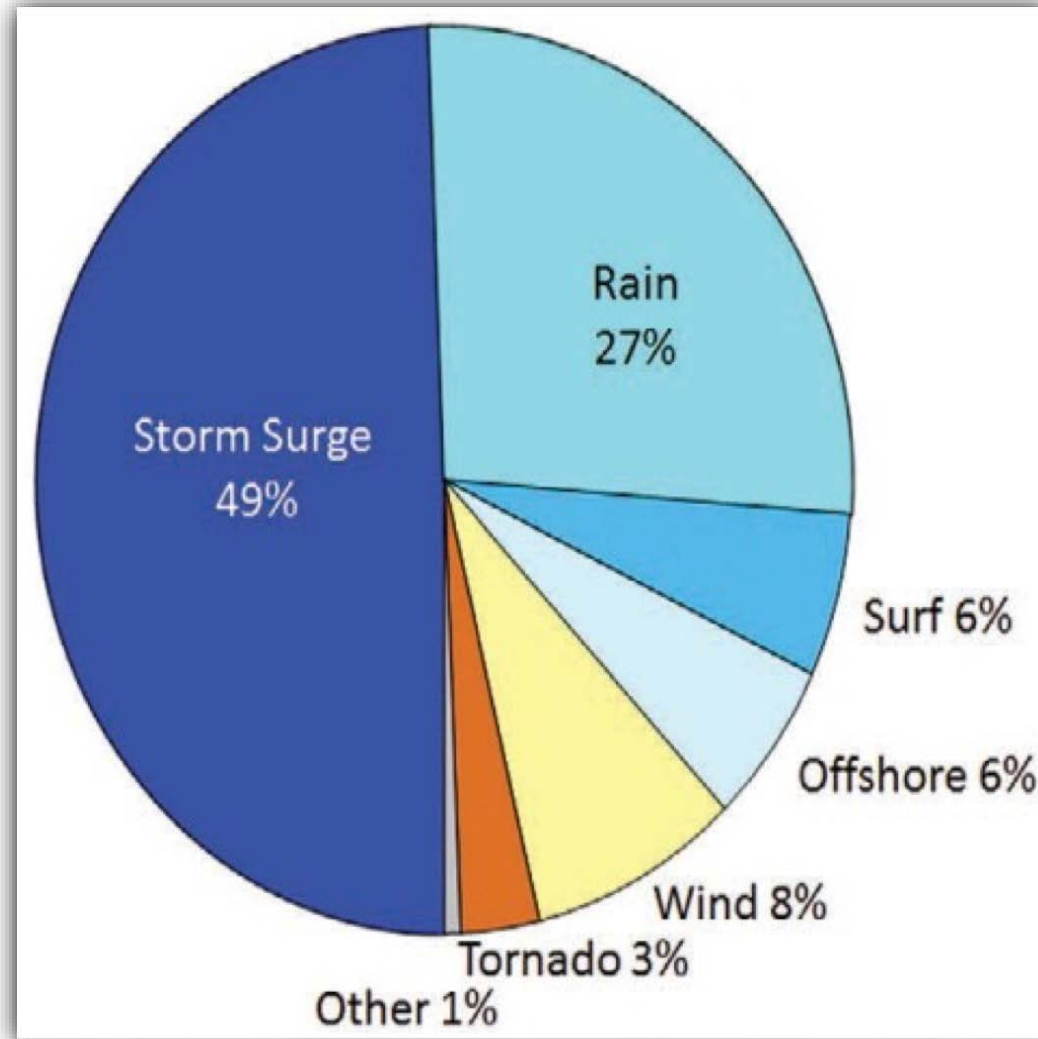


Florida Population : 20,445,808

Florida Population : 4,951,560

Messaging

- Run from the Water, Hide from the wind.
- Go tens of miles, not hundreds of miles.



Causes of death directly attributable to Atlantic tropical cyclones 1963-2012



My Family's Hurricane Andrew Experience

Evacuated 6.7 Miles inland. Stayed in:

- Built in 1986.
- Unreinforced concrete, shingle roof, with wood façade.

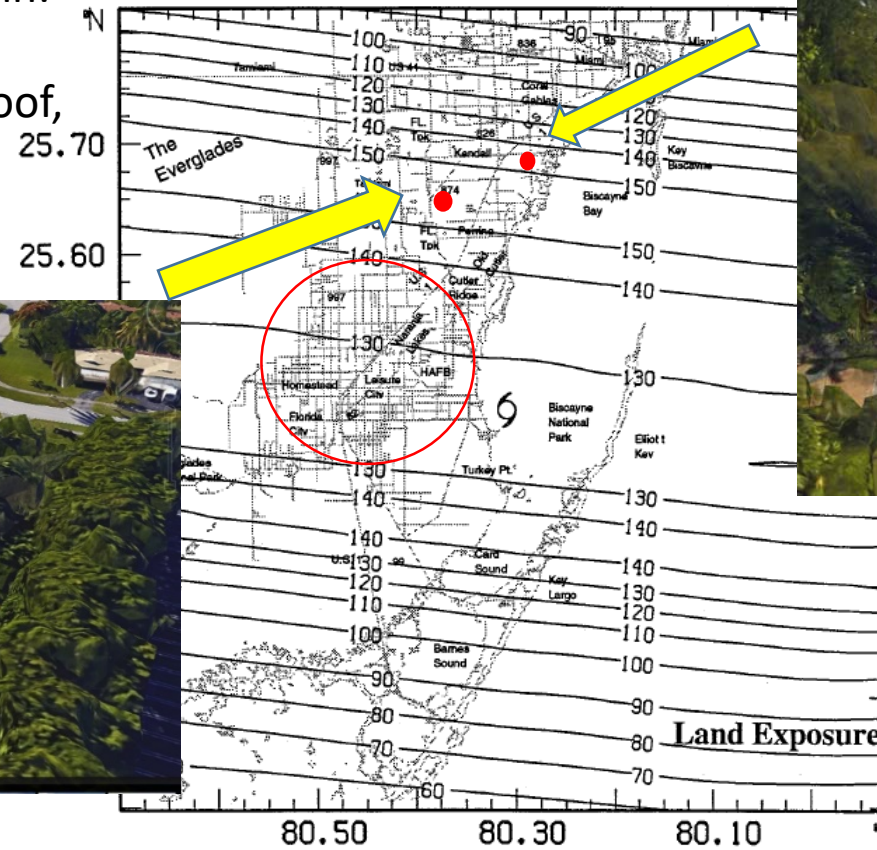


Figure 6. NOAA Hurricane Research Division surface wind analysis of Hurricane Andrew²⁶—reported as fastest-mile wind speed (mph) at 10-meter height and open, inland exposure.





**Insurance
Institute for
Business &
Home
Safety®**

RATING THE STATES: 2015

*An Assessment of Residential Building Code and Enforcement Systems
for Life Safety and Property Protection in Hurricane-Prone Regions*

ATLANTIC AND GULF COAST STATES
MARCH 2015

2015 and 2012 STATE SCORES

State	2015 New Score	2012 Original Report Score
VIRGINIA	95	95
FLORIDA	94	95
SOUTH CAROLINA	92	84
NEW JERSEY	89	93
CONNECTICUT	88	81
RHODE ISLAND	87	78
NORTH CAROLINA	84	81
LOUISIANA	82	73
MASSACHUSETTS	79	87
MARYLAND	78	73
GEORGIA	69	66
NEW YORK	56	60
MAINE	55	64
NEW HAMPSHIRE	48	49
TEXAS	36	18
MISSISSIPPI	28	4
ALABAMA	26	18
DELAWARE	17	17

<http://www.mitigationleadership.com/pdf/IBHS-rating-the-states-2015-public.pdf>



THE FLORIDA DIVISION OF EMERGENCY MANAGEMENT